REMARKS/ARGUMENTS

Claims 1-5, 7-21, and 23-26 are pending in the pending application. Claims 6 and 22 have previously been cancelled. Claims 1, 19, and 25 are independent.

Allowable Subject Matter

Applicants appreciate the Examiner's indication that claim 18 recites allowable subject matter and would be allowed if rewritten into independent form including all of the features of the base claim and any intervening claims. For the reasons presented below, Applicants believe that all of the pending claims are in condition for allowance and earnestly solicit a formal indication thereof.

Art Rejections

Claims 1-5, 7, 8, 10, 11, 13, 14, 16, 19, 20, 21, and 23 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Shima (USP 6,055,094) in view of Yang (USP 6,215,584). Claims 9 and 12 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Shima, Yang and further in view of Alexander (USP 5,532,864). Claims 15, 17, and 24 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Shima, Yang and

further in view of Becker (Erbium-Doped Fiber Amplifiers Fundamentals and Technology, Academic Press, 1999). These rejections, insofar as they pertain to the presently pending claims, are respectfully traversed.

Although Yang and Shima both disclose multi-stage optical amplifiers neither of these patents discloses or suggests various features of the claimed invention, most notably the control circuit and method that controls the variable optical attenuator.

More particularly and in terms of claim 1, the combination of Yang and Shima fails to disclose or suggest a control circuit that generates the attenuation control signal (applied to the variable optical attenuator) in response to an attenuator offset value and input optical power. This is particularly true considering the amendment to claim 1 which further specifies that the attenuator offset value substantially minimizes non-flatness of an output spectrum output from the optical amplification device.

The claimed attenuator offset value is quite distinct from the attenuation adjustment value utilized by Yang. Since the Office Action clearly relies upon Yang to teach this feature it is particular important to examine exactly how Yang's optical amplifier operates.

Although Yang does indeed disclose a multi-stage optical amplifier including a mid-stage variable optical attenuator 80, the control exercised by Yang is completely different than that claimed by the present invention. Specifically, Yang's control circuit adjusts the variable attenuation setting applied to the variable optical attenuator 80 according to the sum of a predetermined value and an attenuation factor. As discussed in column 4, lines 1-11, the attenuation factor is based on a predetermined reference power level and the power level of the input optical signal. In other words, the attenuation factor will change when the input power level of the input optical signal changes. In other words, the attenuation factor is merely based on a simple comparison of the currently measured input power level with a reference power level. Thus, the attenuation factor tracks or follows the change in the input power signal as further discussed in column 10, lines 23-30 of Yang.

In sharp contrast, the claimed attenuation offset value is a constant value that is stored in an attenuator offset value storage device as further recited in claim 1. This constant attenuator offset value is chosen based on the calibration procedure as further discussed on page 14, first full paragraph of the specification. This calibration procedure determines an attenuator offset value that substantially minimizes non-

flatness of the output spectrum output from the optical amplification device. These are features completely absent from Yang and certainly not disclosed or suggested by Yang in any fashion.

Shima also fails to disclose or suggest anything like the claimed attenuator offset value or control of the variable optical attenuator based on an attenuation offset value. While it is true that Shima includes a mid-stage variable optical attenuator 71, this VOA is controlled quite differently than the claimed invention. Specifically, Shima utilizes an automatic level control circuit 72 to control the VOA 71 such that the output power level from the amplifier is held constant. (See column 8, lines 1-13.) This is more specifically discussed in column 11, lines 33-51 which states that the variable optical attenuator attenuates the input signal light according to the optical power level detected by the optical power monitor 92 such that the amplifying portion 1 does not reach saturation.

This is a simplistic power control which is described by Shima in equation 2 at the bottom of column 8. According to this equation, the input and output power levels as well as the gains of the amplifying portions, 1, 3, and 5 are factors in the attenuation quantity L_a. Nowhere is there present an attenuator

offset value within this equation or within any of the disclosure of Shima.

There is also no suggestion of using such an attenuator offset value, particularly as recited in the amended claims. Since neither Yang nor Shima discloses or suggests the control features being recited in the claims, the combination thereof also fails to disclose or suggest the control of the variable optical attenuator now recited in the independent claims.

More specifically in regards to independent claim 19, the combination of Yang and Shima also fails to disclose or suggest the controlling step which controls the optically attenuating step according to the attenuator offset value and the input optical power. This is particularly true in light of the amendment to claim 19 which further recites that the attenuator offset value substantially minimizes non-flatness of an output spectrum output from the optical amplification device being controlled by the claimed method.

Independent claim 25 also patentably distinguishes over the combination of Yang and Shima. Particularly, the controller includes a processing unit that receives an attenuator offset value wherein in the attenuator offset value substantially minimizes non-flatness of an output spectrum output from the optical amplifier. Furthermore, this processing unit outputs an

attenuation control signal in response to the attenuator offset value and the electrical signal representative of the optical power of the optical signal input to the first optical amplifier stage. This attenuation control signal controls the claimed variable optical attenuator in a fashion not disclosed or suggested by Yang or Shima, even when taken in combination.

Furthermore, the addition of Alexander fails to remedy the noted deficiencies in the base combination of Shima and Yang. Indeed, Alexander is merely applied to teach certain aspects of service channels which are not being asserted here as a basis for patentability. Furthermore, Alexander also fails to disclose or suggest the particular control circuit and methodology for controlling a variable optical attenuator as claimed and as more specifically pointed out above. Therefore, the full combination of Shima, Yang, and Alexander fails to disclose or suggest at least the features of the independent claims.

Furthermore, Becker also fails to remedy any of the noted deficiencies in the base combination of Shima and Yang. Indeed, Becker is merely applied to teach certain aspects of multi-stage amplifiers, particularly the multi-stage amplifier may have a low noise, high gain first stage and a high-power second stage. These features are not being relied upon for patentability in the independent claims. Furthermore, Becker fails to disclose or

suggest the control circuit and methodology of the independent claims which are asserted above in great detail. Therefore, the full combination of Shima, Yang, and Becker fails to disclose or suggest the features of the independent claims.

For all of the above reasons, taken alone or in combination, Applicants respectfully request reconsideration and withdrawal of the prior art rejections.

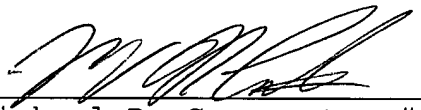
Conclusion

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Michael R. Cammarata (Reg. No. 39,491), at the telephone number of (703) 205-8000, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By 
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